

14 December 1959

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TO:

FROM:

DATE: 8 December 1959

PEOPLE VISITED: Material Consultants - C.K.P.  
F.F.R.

The purpose was to learn about: (1) Their method of bonding plastic to glass; and (2) about any other help they could provide for the design and fabrication of light weight structures.

In regard to (1), we believe their method is potentially attractive especially in the window application involving vacuum seals in high temperature environments. It was agreed that the effect of this bonding should be tested on high quality optical surfaces and the following is planned: (a) We will procure, polish and photograph the interferometer patterns of glass and quartz samples, and they will bond to these and then return them for an interferometer comparison; (b) we will design a mechanical layout of a complete window mounting to permit a joint consideration of it; and (c) we will provide design specifications on window and mounting.

In regard to (2), their experience with honeycombs and plastics is extensive and will be utilized to the maximum extent possible. It was agreed that they will provide design data on various materials.

DATE: 9 - 10 December 1959

PEOPLE VISITED: Vehicle Contractor - C.L.J.  
E.F.H.  
D.E.B.  
D.B.C.

The purpose was to (1) establish layout of system and windows; (2) consider environment for the system; (3) exchange information on window mounting, cooling and operation; (4) discuss electronic regulation; (5) discuss flight test instrumentation; (6) discuss operator control; (7) delineate periscope operation.

In regard to (1), the "S"-system, (as described in Document 84), was modified to permit two flat windows in the "V" bottom. This required a longitudinal separation of the two optical systems to an overall length of about 44 inches, and by having the paper supply next to the forward unit scanner and the electronics next to the rear unit scanner this appears to contain the entire system.

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In regard to (2), the concept of environmental control, illustrated in Figure 5 of Document 84, was discussed. The difficulty of accomplishing control in this fashion seemed potentially unnecessary to the vehicle contractor. We pointed out that the concept was theoretically more favorable than a pressurized Q-bay, and that if the system were not built this way, it would probably be impossible to later modify it. It was agreed that we would attempt a quantitative evaluation of the influence of pressure and temperature on system performance.

In regard to (3), the analyses of alternate window configurations, (as illustrated in Document 77), were discussed. Temperatures obtained with their analog computer agreed with ours within  $10^\circ$ . They will supply data indicating the amount of cooling air they can supply. They pointed out that oil contamination of the cooling air was probable.

We will supply three glass plates for tests they plan to conduct. They require firm window configuration data by March 1, 1960 in order to manufacture the hatch for these tests.

In regard to (4), our requirements are not being met by the vehicle power supply. Therefore, we will have to filter some of our power where required, (although, not known at the time of the meeting, this now appears to be 200 watts of the 300 watts we require). Although the inertial guidance system requires power with regulation similar to our requirement, no overall weight saving appears achievable in using a common regulation system since the inertial guidance system is presently located about 30 feet aft of our equipment. If the inertial guidance system is relocated substantially closer to the Q-bay, the possibility of a common regulation system should be re-examined.

In regard to (5), they plan to conduct flight tests with a telemetering package in the Q-bay when our system is not installed. While this will allow simultaneous testing of the window with telemetered information, the system itself can not be flight tested with the telemetering equipment. Consequently, the system will require Century (or similar) recorders. We can certainly share this equipment with other contractors on the project but we will probably require the exclusive use of two recorders from March 1960 to October 1961. EFM suggested that provision be made to mount these recorders directly on the system and this is an excellent idea provided that the unbalance created by the paper shift is tolerable.

In regard to (6), we explained our desire to have all standby and warmup operation automatically activated at the time of main power plant start up, so that the driver need only throw one switch at the start and end of the high altitude cruise. However, our reliability analysis suggests that some circuit redundancy might significantly improve system reliability. This could be done automatically or by the driver, and it was agreed that the driver is a better approach. Consequently, there will be approximately six switches on the driver's control which will activate a

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a redundant circuit when the driver's display indicates a requirement.

In regard to (7), we presented some preliminary data on a periscope for navigation correction and viewing. Since navigation correction has already been planned, more complete data on a purely viewing periscope will be provided. Provision for hindsight to observe the presence or absence of a jet trail would be desirable.

Also discussed: They will supply us with a Q-bay mock up by about mid-January; we will investigate the potential use of the inertial guidance system to provide stabilization; we will improve our estimates of weight, electrical power requirements and heat dissipation for the "S" System.

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NDR:mb

cc: MC  
VC  
HDQ ✓